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from that found in *Botrychium*; while in *Helminthostachys* the fertile spike is interpreted as representing a single pinna. This would dispose of the sporangio-phore nature of the spike, and revert to ROEPER's view (in 1826) that it represents two fused basal pinnae.

The general conclusion is that the Ophioglossaceae are related to the ferns, and "have sprung from near the level of the Osmundaceae."—J. M. C.

The strobilus of *Selaginella*.—Miss GERTRUDE MITCHELL³² has recorded some general studies of the strobilus of *Selaginella*, which fill up certain gaps in our knowledge, and "confirm or controvert statements" of other investigators.

In some species the axis was observed to renew its ordinary vegetative character beyond the strobilus: in one case abortive sporangia were produced in the axils of the foliage leaves just beyond the tip of the strobilus; in another species a second strobilus was produced upon such an axis, the two strobili being separated by a sterile region; and in still another case a branched strobilus was noted. The distribution of sporangia is variable, and species are enumerated under the following heads; one large basal megasporangium, several basal megasporangia succeeded by microsporangia, strobili wholly megasporangiate or microsporangiate, and an indiscriminate arrangement. The species are also enumerated that mature one, two, or three megaspores, instead of the more usual four, and also two rare cases in which there are twelve (*S. Vogeli*) and eight (*S. involvens*) megaspores. Considerable attention is given to the sporangium wall and its mechanism for dehiscence, involving what are spoken of as "its wonderful adaptations for cross-fertilization." The paper closes with a brief consideration of the vascular anatomy of the strobilus and the ligule.—J. M. C.

The stele of *Osmunda*.—The vascular anatomy of this genus has given rise to much discussion and to divergent opinions as to its phylogenetic significance. FAULL³³ has now investigated abundant material of the sporelings of *O. cinnamomea* in all stages, and has reached the following results and conclusions: The cortical cells at the base of the sporeling are inhabited by a fungus. While there is considerable variation in the development of different individuals, in no case is the transition from protostele to siphonostele effected by a simple expansion, as has been claimed for Osmundaceae. There are bays or gaps in the xylem near the nodes, which may result in inclosing a "stelar" pith. Rarely and only in adult stems does the internal endodermis and "extrastelar" pith connect with the external endodermis and cortex through leaf gaps. Internal phloem has been found in unbranched adult plants, and this fact, together with the absence of branching in the sporeling, is thought to indicate that internal phloem and

³² MITCHELL, GERTRUDE, Contributions towards a knowledge of the anatomy of the genus *Selaginella* Spr. Part V. The strobilus. *Annals of Botany* 24:19-34. pls. 3, 4. 1910.

³³ FAULL, J. H., The stele of *Osmunda cinnamomea*. *Trans. Canadian Inst.* 8:515-534. pls. 4-6. 1909.